If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

14.11 C-A EMS Process Assessment for LINAC (AGS-576-LIN)

Text Pages 1 through 15

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

J. Scott

14.11 C-A EMS Process Assessment for LINAC

BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT FORM

I. General Information

Process ID:	AGS-576-LIN			
Process Name:	Linear Accelerator (Linac)			
Process Flow Diagrams:	AGS-576-LIN-01, -02, -03, -04, -05, -06, -07, -08			
Process Description:	This process assessment covers activities conducted inside the Linear Accelerator (Linac), Building 930. The Linac supplies protons for the AGS Booster, the high-energy physics program, the nuclear physics program at RHIC or for the production of radiopharmaceuticals at the BLIP facility. Building 930 houses the linear accelerator; high-voltage electrical systems including power supplies, transformers, and capacitor banks; cooling-water systems; radioactive materials storage areas and several small machine shops. Environmental aspects associated with the Linac include radioactive waste generation and storage, atmospheric discharges, liquid discharges, chemical storage, and hazardous waste generation. Applicable Subject Areas include: Radioactive Airborne Emissions, Non-radioactive Airborne Emissions, Storage and Transfer of Hazardous Materials, Liquid Effluents, Lead, PCB Management, Hazardous Waste Management and Radioactive Waste Management.			
Dept./Div.:	Collider-Accelerator (C-A) Department			
Dept. Code:	AD			
Building(s):	930, 930A, 930B			
Room(s):	N/A			
Points of Contact:	B. Briscoe V. LoDestro			
Originally Prepared by:	G. Schroeder	Original Reviewers:	B. Briscoe G. Goode V. LoDestro P. Stillman	
Initial Release Date:	04/11/00			

II. Detailed Process Descriptions and Waste Determination

The Brookhaven Linear Accelerator (Linac) was designed and built in the late 1960's as a major upgrade to the Alternating Gradient Synchrotron (AGS) complex. It is housed in Building 930. Its purpose is to provide accelerated protons for use at the Brookhaven Linac Isotope Producer (BLIP) and C-A Department facilities. The basic components of the Linac include ion sources, radio-frequency quadropole (RFQ) pre-injector and nine accelerator RF cavities spanning the length of a 140-meter tunnel. The Linac is capable of producing up to a 35 mA proton beam at energies up to 200 MeV for injection into the AGS Booster or for the activation of targets at the BLIP. In total, the facility includes Buildings 930, 930A, the 930 Annex and Building 946 which houses water cooling equipment for the BLIP beam stops. Cooling water systems associated with the Linac have been evaluated under Process Assessment AGS-004-CWS.

Building 930 houses the linear accelerator itself, high-voltage electrical systems, cooling water systems, radioactive materials storage areas and several machine and tech shops. The Building 930 floor plan can be broken down into four basic areas: the Upper Equipment Bay, the Lower Equipment Bay, the Linac tunnel and the Machine Shops. The Upper Equipment Bay is on the second floor of the building and houses all of the electrical equipment required to run the Linac. This includes power supplies, transformers, and capacitor banks. The Lower Equipment Bay is on the first floor, parallel to and to the north of the Linac tunnel. It houses air handling units, radioactive materials storage areas, vacuum systems, water pumps and other components associated with the cooling water system. Machine shops are located at the west end of the building on both the first and second floors.

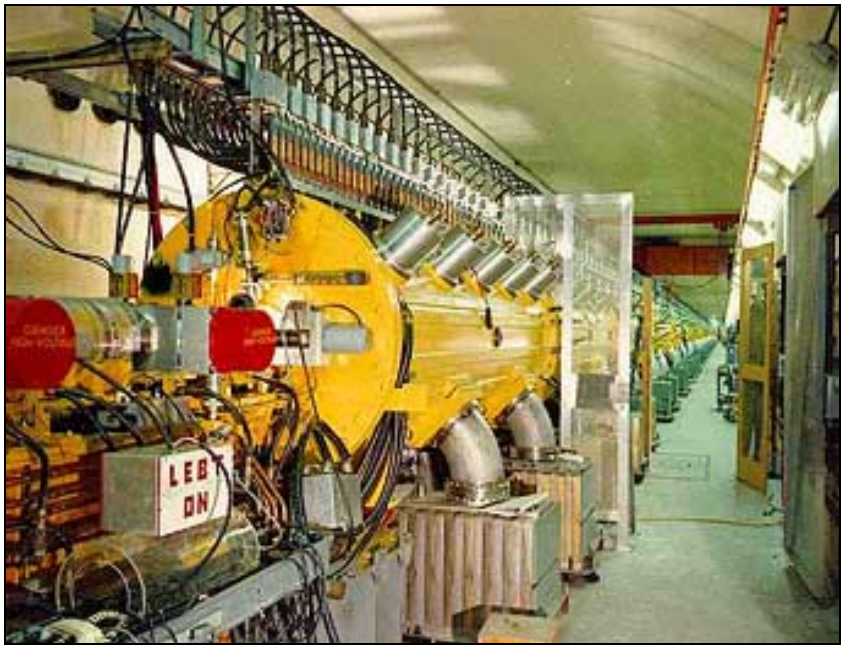
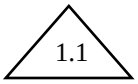


Figure 1 RF accelerating cavities in tunnel, looking east

Regulatory Determination of Process Outputs

1.0 Electrical Shops

Electrical component assembly and repair takes place in three areas (Pulsed Power Shop, 930B, and second floor electrical shop). Most activities conducted here involve soldering using either rosin-core or lead/tin solder. Light industrial chemicals are in use such as acetone, ethyl alcohol that is used as a general cleaning solvent, glass cleaner,, PVC cement that is used for insulation work, and spray paints. Spray paints are not used in the shop, but are used outside the building by shop staff (1.1). Wire scraps are swept from floor or benches and sent for recycling. Solder scraps are collected in small labeled containers and given to Central Shops for recycling.. See process flow diagram AGS-576-LIN-01.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
	Atmospheric emissions from spray cans	Non-hazardous vapor as determined by process knowledge	Released to ambient air	None
	Wire scraps	Non-hazardous waste as determined by process knowledge	Placed in metals bins and sent for recycling	None
	Solder tailings	Hazardous waste if it contains lead or silver	Tailings are collected in containers and full containers go to Central Shops for recycling	None

2.0 Machine Shops

Building 930 shops are used for general parts machining. There are three shops in total. Two shops are located on the first floor of Bldg. 930; that is, one shop is split into two shops known as the east and west rooms. The third shop is on the western end of the Upper Equipment Bay. They contain machining equipment such as drill presses, sanders, grinders, and lathes. One NYSDEC permitted fume hood (Permit #93001) is in the ground floor shop and had traditionally been used for electroplating and acid etching, though its use for this type of work has been discontinued. Plating/etching chemicals, which were stored in a cabinet below the hood, have been removed for disposal through the Environmental and Waste Management Services Division Division. The hood is now used when cleaning components of the Polarized Proton Ion Source. Activities taking place in the shops include magnet fabrication, mechanical assembly, vacuum component testing, and spray painting, described below.

Magnet fabrication - Some magnet fabrication work takes place within Building 930, mostly on prototype magnets such as the designs used in the AGS Booster or the Spallation Neutron Source. During fabrication, copper wire is wound around steel jigs. Epoxy resin, commercial brand Epon Resin 815, is flowed into the winding channels, making the winding permanent. Work with epoxy resin is done on the open floor without a ventilation hood. Resin is stored in a 55-gallon drum in the first floor machine shop. The drum is stored horizontally, with a dispensing spout. A plastic tray sits below the spout to catch drippings. If a magnet has to be unwound due to a discovered flaw, the old wire is disposed of as metal scrap (2.1).

Mechanical Assembly – Most mechanical assembly in Building 930 involves the fabrication of metal components such as beam-line ports, flanges and blank-off plates. Paper rags and cleaners such as alcohol, acetone or LPS Presolve are used to wipe the parts clean following machining. There are containers specifically for oily rags throughout the shop for segregation and separate disposal as industrial waste (2.2). Empty cleaner and lubricant containers are discarded in the regular trash (2.3). Metal shavings are segregated for collection in the metals recycling stream (2.4).

Component Testing – Testing of vacuum system parts is done in the shops and requires the use of vacuum pumps and inert, compressed gases such as helium or argon which are used to displace normal air during the testing (2.5).

Spray Painting - There are two general shop areas on the second floor, one at the west end of the Upper Equipment Bay, and one immediately adjacent to the Upper Bay on the southern perimeter of the building. The shop area in the Upper Equipment Bay contains an air hood in which spray painting and lacquer application (2.6) takes place. There is an area beside the hood designated for cutting and welding work. Note that no NYSDEC air permit is required for this hood since the use of aerosol sprays falls into the “trivial/exempt-permitting” category.

Bead Blasting - A bead blaster unit with a NYSDEC permitted air exhaust (Permit #93002) is located in a room adjacent to the west side of the ground-floor shop. The bead blaster is a fully enclosed booth in which machine parts are sprayed with an air stream containing small glass beads, which abrade the part. After spraying, the glass beads settle in the bottom of the booth. They are removed from the bottom of the booth and are reused or disposed of (2.7), depending upon condition.

Other generic wastes routinely generated by the shops include plastic and metal shavings, oily rags, wire scraps, empty LPS Presolve aerosol cans, flexible tubing, bundled wire and empty oil drums. See process flow diagram AGS-576-LIN-02.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
2.1	Copper wire magnet windings	Non-hazardous solid waste as determined by process knowledge	Disposed of as metal scrap	None
2.2	Oily rags	Non-hazardous, industrial waste / process knowledge	Disposed of as industrial waste	None
2.3	Empty cleaner and lubricant containers	Non-hazardous, process knowledge	Disposed of in regular trash or collected for recycle	None
2.4	Metal shavings	None-hazardous (if used for recycle) / process knowledge	Segregated in metals bin and collected for recycling	None
2.5	Fugitive helium or argon gas emissions	Non-hazardous vapor as determined by process knowledge	Released to ambient air	None
2.6	Air emissions from spray cans	Non-hazardous vapors as determined by process knowledge	Ventilation provided by air hood	None
2.7	Blasting beads	Non-hazardous/ process knowledge	Disposed of in regular trash after radioactivity sampling	None

3.0 High Voltage Testing Area

Previously, beamline component testing occurred in the High Voltage Testing Area, which is a caged and gated area directly across from the first-floor machine shop. It was converted into use primarily as a stock room, used to store 55-gallon drums of Univolt N61 and Caltran 60-15 transformer oil for replenishing transformers. Currently, the area is occasionally used to stage a barrel of used transformer oil, from outside of Linac, prior to being pumped into the storage

tanks (See paragraph 5.0). After having the tops cut off, empty drums are sent out as salvage (3.1). See process flow diagram AGS-576-LIN-03.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
3.1	Empty transformer oil drums	Non-hazardous / process knowledge	Sent for salvage	None

4.0 Lower Equipment Bay

The Lower Equipment bay houses cooling-water system pumps, vacuum pumps, electrical equipment racks, HVAC air handlers, air compressor and dehydrators, and radioactive materials storage areas for solids that have become activated as a result of being in the Linac beam line (4.1).

There are four air handlers in the Lower Bay, eight on the roof, and two in the basement. Air handler filters are periodically replaced. Since radioactive beryllium-7 is generated through air activation in the Linac tunnel during operations with beam, any air filters that process this air may become contaminated. Therefore, used filters are initially handled as low-level radioactive waste. Beryllium-7 has a 53-day half-life and qualifies for treatment under the "decay in storage" policy described in the Radioactive Waste Management Subject Area. Following a holding period of no less than 10 half-lives and a confirmatory field survey, the filters are disposed of as non-radioactive waste (4.2). See process flow diagram AGS-576-LIN-04.

The nitrogen membrane generator installed in the Lower Equipment Bay of Building 930 in January 2003 has the following atmospheric discharges:

1. The waste gas from the generator is the byproduct of the nitrogen/air separation process. This gas is an oxygen-enriched mixture of nitrogen and oxygen. Oxygen is about 35 percent of the mixture. The waste gas discharges outside the building at 12 feet above grade.
2. Relief and vent valves in the new nitrogen generator system discharge outside the building through the same line.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
4.1	Activated equipment	Radioactive / process knowledge	Stored on premises until sent to Environmental and Waste Management Services Division for disposal as rad waste	None
4.2	Air handler filters	Radioactive / process knowledge	Treated by Decay-In-Storage before disposal via regular trash	None

5.0 Upper Equipment Bay

The Upper Equipment Bay houses high-voltage electrical equipment needed to run the Linac RF system such as powers supplies, capacitor banks and power amplifiers. Many heavy-duty capacitors are in use on this floor, some of which contain PCBs. At several locations along the length of the Upper Equipment Bay, replacement and spare capacitors are stored in groups of four or five on the floor, in plastic or metal tray secondary containment. Capacitor cabinets are routinely inspected for leaking units. If leaking units are discovered, the oil is cleaned up with towels or rags and speedi-dry absorbent (5.1). Alcohol may be used as a final cleaning stage and is allowed to evaporate. Clean-up materials are bagged and disposed of as industrial waste if the oil contains no PCBs or as hazardous waste if PCBs are present. Shop vacuums are used to occasionally vacuum dust and grit from the inside of the electrical cabinets (5.2).

In the past the Linac had oil-filled isolation transformers, non-PCB type, that were occasionally drained, with the old oil being pumped to one of the two 1,000 gallon capacity outdoor storage tanks located on the south side of Building 930 (BNL ID 930-01 and 930-02, SCDHS #210 and #211, see Figure 2). These oil-filled isolation transformers have been obsolete in the Linac area and were recently disconnected from piping that led from the storage tanks to inside Building 930. Since this piping was not double walled, the piping to the tanks was not Suffolk County Article 12 compliant. The fill piping from the building to the storage tanks was removed in January 2003 and capped at the building walls, and C-AD requested a review by SHDS to approve these tanks as fully compliant with Article 12. If tanks are used, then they are filled manually from outside using C-A Department work planning systems. We note the tanks are still used for storing old transformer oil from areas outside of Linac. Following analytical testing for metals, total halogens and PCB content, the oil in these tanks is transported to the BNL Central Steam Facility for burning as “specification used oil fuel” as defined in 6NYCRR Part 374.5. (5.3) or disposed of as industrial waste if it does not meet burning specifications.

Figure 2 Oil storage tanks outside of Bldg 930

Each of the 10 high-voltage capacitor banks in the Upper Equipment Bay is equipped with 2 mercury-vapor ignition switches. The cathodes of the tubes are cooled by a domestic water loop that discharges to Recharge Basin HT. Expired tubes are returned to the manufacturer for recovery and recycling of the mercury metal (5.4). See process flow diagram AGS-576-LIN-05.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
5.1	Transformer oil spill clean-up materials	Hazardous or non-hazardous, depending on type and PCB status	Disposed of through Environmental and Waste Management Services Division as industrial or hazardous waste depending on oil type	None
5.2	Used shop vacuum bags	Non-hazardous, non-radioactive / process knowledge	Regular trash	None
5.3	Non-PCB Transformer oil	Industrial waste / process knowledge	Stored in 1,000 gallon tanks and transported to Steam Plant for burning or disposed as industrial waste	None
5.4	Mercury vapor ignition switches	Hazardous / process knowledge	Returned to manufacturer for mercury recovery	None

6.0 Linac tunnel

Due to the energy of the proton beam, airborne radionuclides are produced through activation and/or spallation interactions. The most significant production point of airborne radionuclides occurs inside the tunnel where the beam crosses a 0.5-inch air gap as it enters the BLIP vacuum system. This is the only existing air gap within the Linac beam transport system. The tunnel is serviced by an air ventilation system driven by a 2,000 CFM blower. The air exhaust is directed through a HEPA filter to an external stack which is located atop a small hill behind Building 931. The physical stack is approximately 11 meters tall. Based on direct measurement, airborne radionuclides that may be released from this stack include: ^{11}C, ^{13}N, ^{38}S, ^{38}Cl and ^{39}Cl. During operations with beam, this stack constitutes an air emission source, which must comply with 40 CFR 61, Subpart H (NESHAPs). It has been previously evaluated and found to be a "minor" source, requiring only periodic confirmatory sampling to demonstrate compliance with the Rule. See memo from G. Schroeder to E. Lessard, December 30, 1998. Following this evaluation, the decision was made to disable the blower, eliminating the stack as an emission source. The

blower has been placed on permanent “Lock Out, Tag Out” status, and the radionuclides listed remain in and decay in the Linac enclosure.

The HEPA filter for this exhaust has neither been tested nor changed within recent years, due to the high residual radiation fields from magnets in the immediate area. There are no immediate plans to change this filter. However, if there were, the used filter would be eligible for treatment by decay-in-storage since the longest half-life of any of the listed airborne radionuclides is 2.9 hours.

Maintenance activities that take place inside the tunnel include vacuum line leak checking and magnet cleaning using HEPA-filtered vacuum cleaners. Beam line vacuum line leaks are checked by evacuating various chambers and replacing the atmosphere with compressed helium gas connected to a pump station. Helium is used since it is easily detected. Fugitive helium gas may be released during this type of operation (6.2).

Beam-line magnets may be cleaned using HEPA-vacs to remove dirt and debris that accumulates over time (6.3). Any vacuuming done in the tunnel is performed with a HEPA-vacuum due to the possible presence of radioactive particulates in the area. During cleaning, one of the components that sometimes breaks down and requires replacement is kapton-wrapping tape. After vacuuming, the old tape is removed, disposed of, and the magnet is rewrapped (6.4). See process flow diagram AGS-576-LIN-06.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
6.1	Tunnel Exhaust Air	Radioactive as determined by direct measurement	Previously released to atmosphere, currently unventilated	None
6.2	Fugitive helium gas	Non-hazardous / process knowledge	Released to atmosphere	None
6.3	Vacuuming debris	Potentially radioactive / process knowledge	Surveyed, disposed of in regular trash if clean, to rad waste if contaminated	None
6.4	Kapton tape	Non-hazardous / process knowledge	Disposed of in regular trash	None

7.0 EBIS

The Electron Beam Ion Source (EBIS) is located on the west end of the first floor of Building 930. EBIS is a technology test bed for the development of new ion sources, which may eventually replace Tandem Van de Graaff generators for this purpose. The current EBIS setup utilizes a self-contained cooling-water system. Water is supplied from the BNL potable water system when water make-up is required. However, the cooling water is continuously recirculated and discharges to neither the site sanitary nor the storm water system. The cooling water is not radioactive. D.I. cartridges are in the cooling water loop to minimize water conductivity under the high voltages generated by the machine. Cartridge replacement is very infrequent. When replacement is needed, the manufacturer accepts them for replenishment (7.1). The only other input materials for the operation of this device are liquid nitrogen and helium used in the EBIS cryostat, which may create some fugitive vapors in the work area if boiling occurs (7.2), and argon gas used to purge vacuum components during testing (7.3). See process flow diagram AGS-576-LIN-07.

Figure 3 Electron Beam Ion Source

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
7.1	Spent D.I. cartridges	Non-radioactive, non-hazardous as determined by process knowledge	Returned to manufacturer for regeneration and re-use	None
7.2	Liquid nitrogen / helium vapors	Non-hazardous as determined by process knowledge	Released to ambient air	None
7.3	Fugitive argon gas emissions	Non-hazardous / process knowledge	Released to ambient air	None

8.0 Polarized Proton Ion Source

A new polarized hydrogen ion source, known as the Optically Pumped Proton Ion Source (OPPIS), is installed at the front end of the Linac to provide higher polarized proton intensity for RHIC spin physics. This system uses a superconducting solenoid, which is cooled by liquid helium. The helium vent line and pressure relief valves of the magnet are vented to the outside atmosphere (8.1). The helium consumption rate is low at about 0.14 liters per hour. Atmospheric emissions of inert gasses are considered "trivial" under NYSDEC regulations and no permitting is required for this source.

Sodium and rubidium alkali metals are used in the source in very small quantities, about 100 and 150 grams, respectively. The rubidium is used as a source of electrons used in polarizing protons. Using a recirculating oven, sodium is heated and converted into a vapor through which the proton beam passes. With exposure to air, the rubidium will oxidize, eventually necessitating replacement. Sodium deposits also need to be removed for proper functioning of the system. The sodium and rubidium are inserted and removed from the OPPIS (see Figure 4) through the use of "exchange cells." When the system has to be cleaned, the exchange cells, collimators and other contaminated parts are rinsed with regular water. The resulting wastewater is non-radioactive, but highly basic and is neutralized with hydrochloric acid. Following neutralization, the rinse solution is discharged to the sanitary system, a process that has been reviewed by the Liquid Effluent Subject Matter Expert.

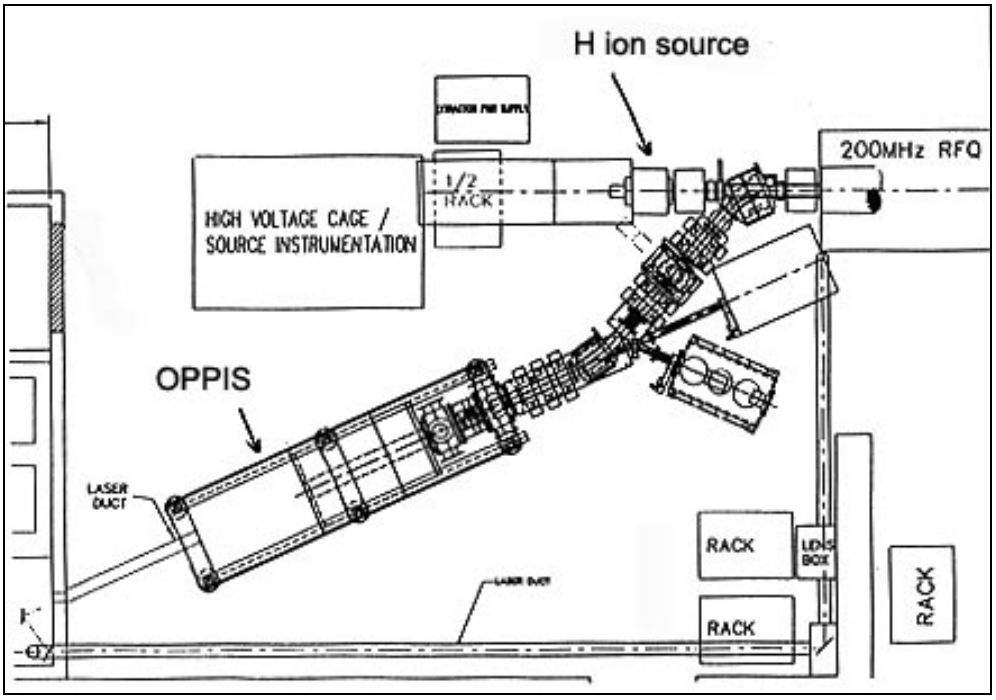


Figure 4 OPPIS schematic

The cleaning operation is performed in the fume hood located on the ground-floor machine shop that was formerly used for metal etching operations. An emission source modification form for the cleaning work was submitted to the Environmental Services Division. It was determined that because the work supports a research activity at the Linac, it is considered exempt from NYSDEC air permit filing requirements. (See J. Williams to V. LoDestro, April 3, 2000.) See also process flow diagram AGS-576-LIN-08.

Waste ID	Waste Description	Determination/Basis	Waste Handling	Corrective Action Required
△ 8.1	Helium vapor	Non-radioactive, non-hazardous as determined by process knowledge	Released to atmosphere	None
□ 8.2	Rinse water containing rubidium and sodium	Non-hazardous after neutrlization, non-radioactive as determined by process knowledge	Discharged to sanitary system	None

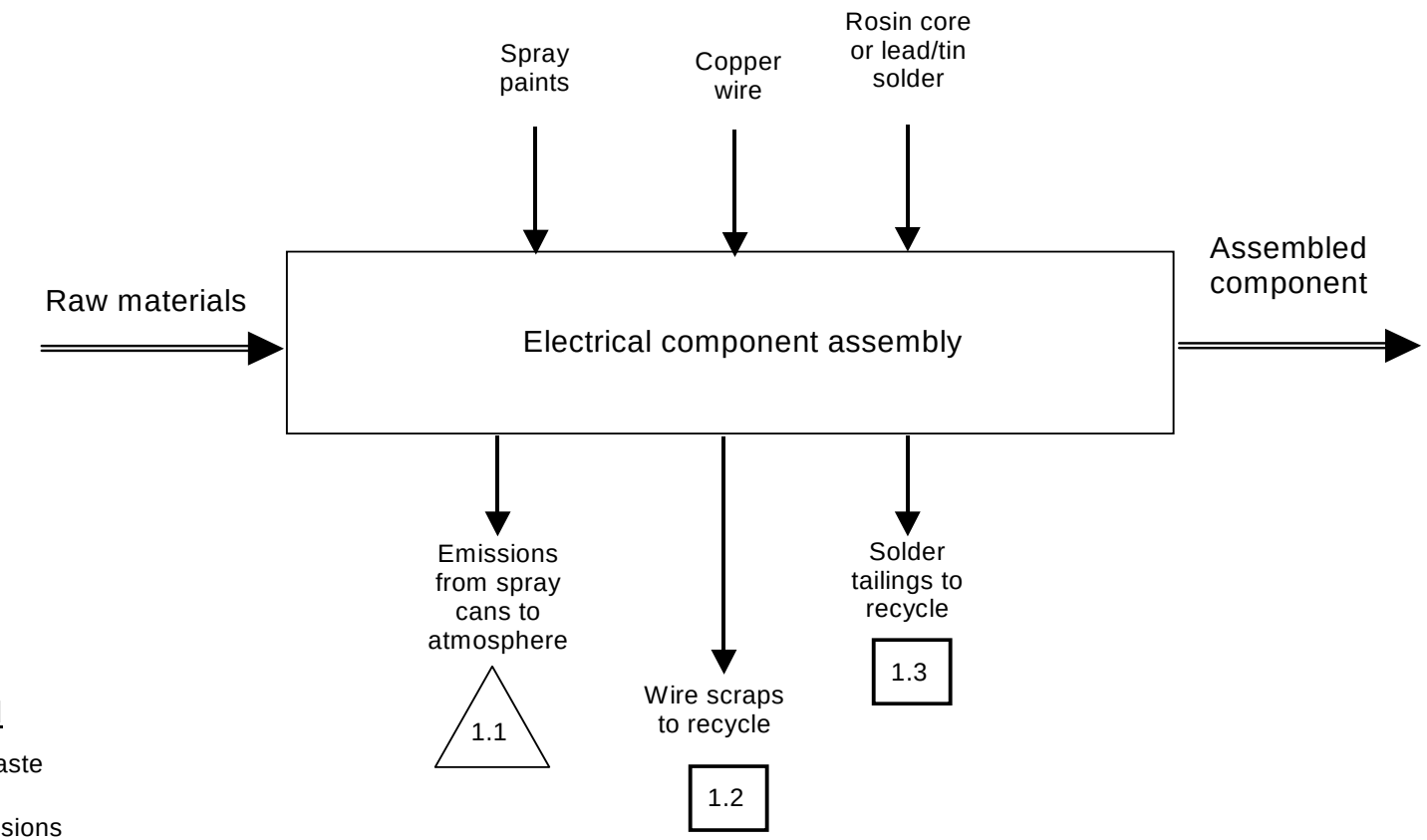
III. Waste Minimization, Opportunities for Pollution Prevention

During the initial effort of baselining the Collider-Accelerator Department processes for Pollution Prevention and Waste Minimization Opportunities each waste, effluent, and emission was evaluated to determine if there were opportunities to reduce either the volume or toxicity of the waste stream. Consideration was given to substitute raw materials with less toxic or less hazardous materials, process changes, reuse or recycling of materials and/or wastes, and other initiatives. Action taken on each of the Pollution Prevention and Waste Minimization items identified can be found in the Environmental Services Division's PEP 2000 Database. Further identification of Pollution Prevention and Waste Minimization Opportunities will be made during an annual assessment of C-A processes. If any Pollution Prevention and Waste Minimization Opportunities are identified they will be forwarded to the Environmental and Waste Management Services Division for tracking through the PEP Database.

IV. Assessment Prevention and Control

During the initial effort of baselining the Assessment, Prevention, and Control (APC) Measures, operations, experiments, and waste streams were reviewed. Operations were described that have the potential for equipment malfunction, deterioration, operator error, discharges or emissions that may cause or lead to releases of hazardous waste or pollutants to the environment, or that may potentially pose a threat to human health or the environment. A thorough assessment of these operations was made to determine: if engineering controls were needed to control hazards; where documented standard operating procedures needed to be developed; where routine, objective, self-inspections by C-AD supervision and trained staff needed to be conducted and documented; and where any other vulnerability needed to be further evaluated. Action taken on each of the Assessment, Prevention and Control Measures can be found in the Environmental Services Division's PEP 2000 Database. Further identification of Assessment, Prevention and Control Measures will be made during an annual assessment of C-AD processes. If any Assessment, Prevention and Control Measures are identified they will be forwarded to the Environmental and Waste Management Services Division for tracking through the PEP Database.

PROCESS FLOW DIAGRAMS



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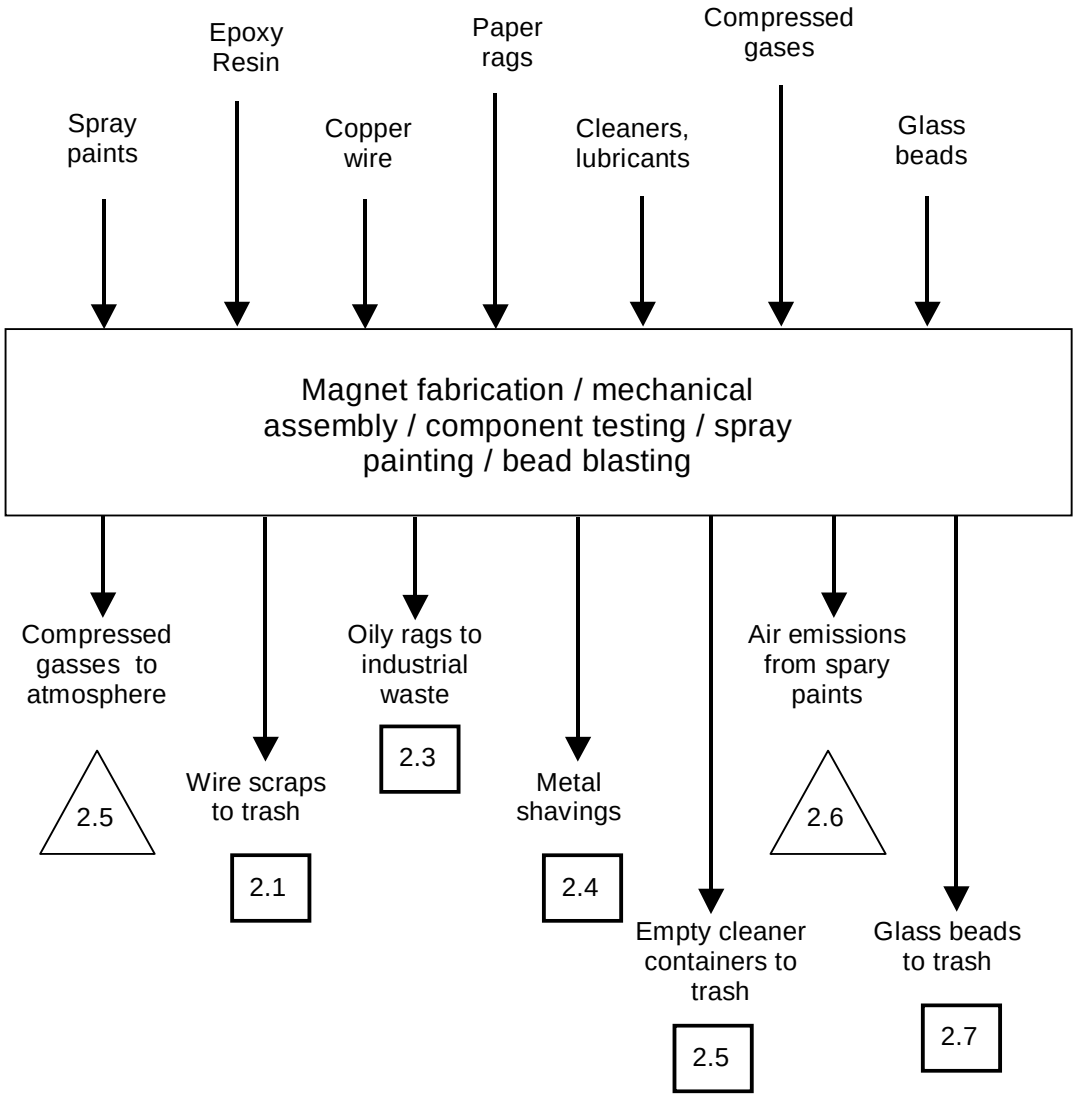
BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

Pulse Power Shop
Process Flow Diagram

AGS-576-LIN-01



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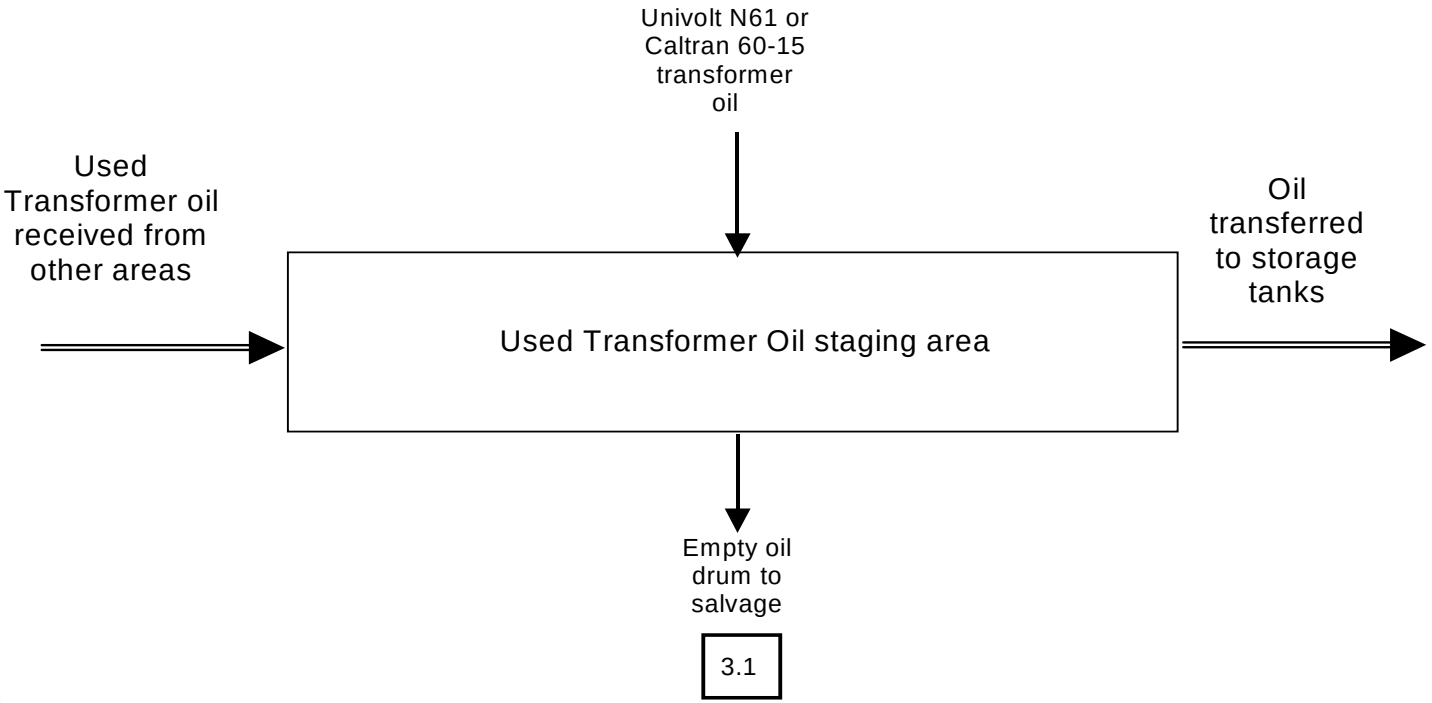
BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

Machine Shops
Process Flow Diagram

AGS-576-LIN-02



Legend

- Solid Waste
- Air Emissions
- Wastewater

SS = Sanitary Sewer

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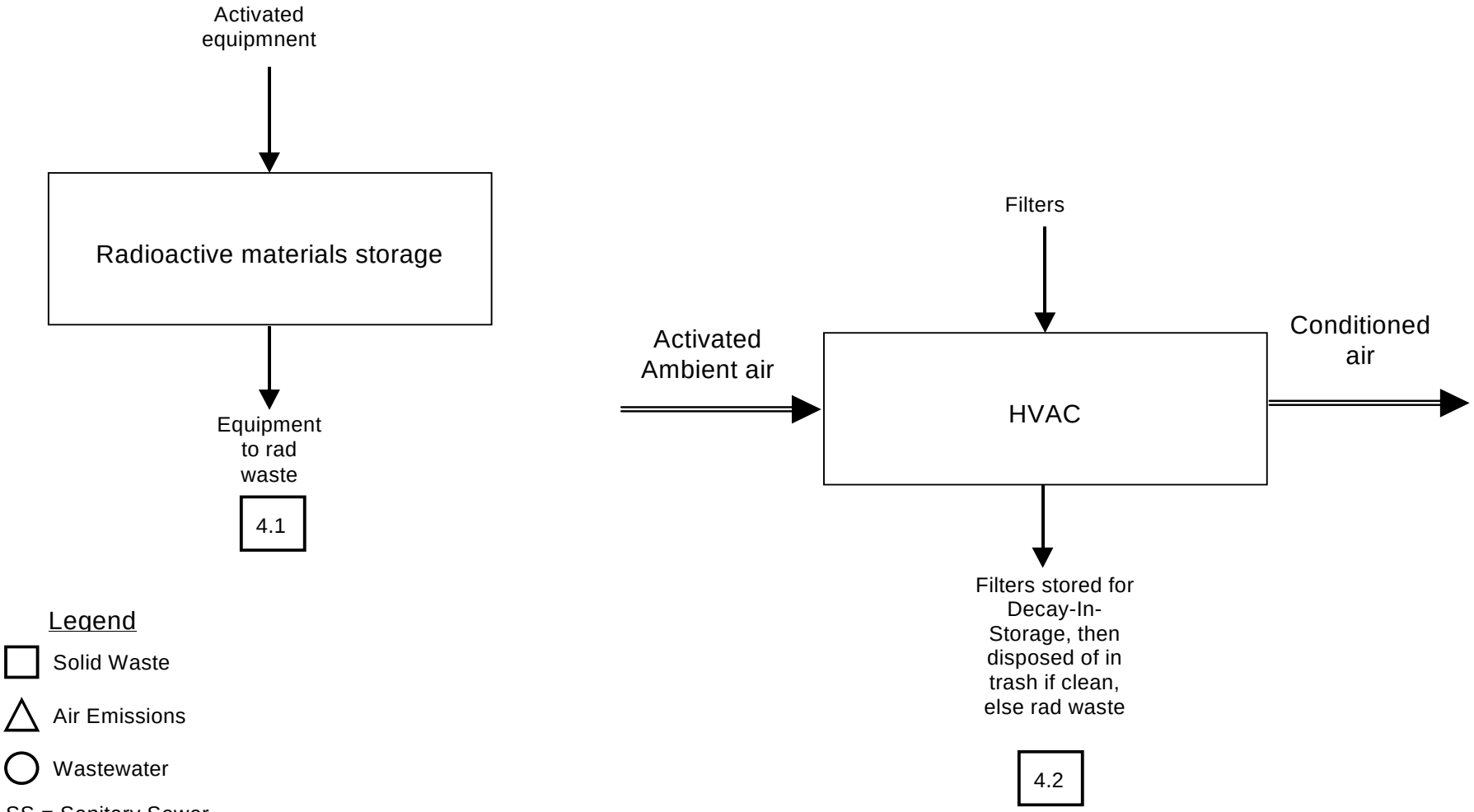
BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

High Voltrage Testing Area
Process Flow Diagram

AGS-576-LIN-03



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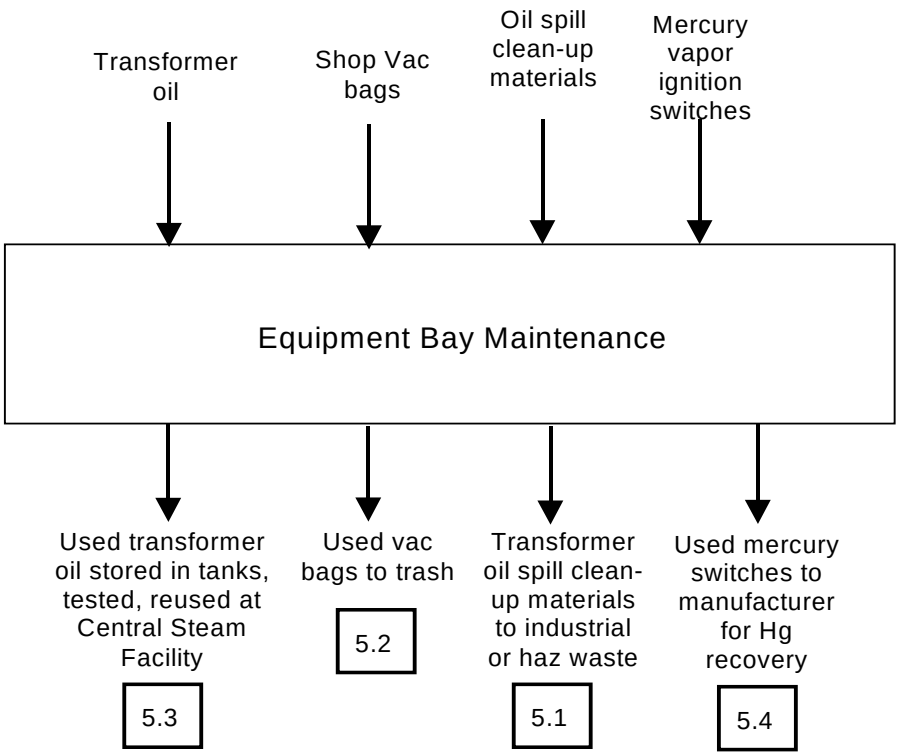
BROOKHAVEN NATIONAL LABORATORY

BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

Lower Equipment Bay Process Flow Diagram

AGS-576-LIN-04



Legend

- Solid Waste
- Air Emissions
- Wastewater

SS = Sanitary Sewer

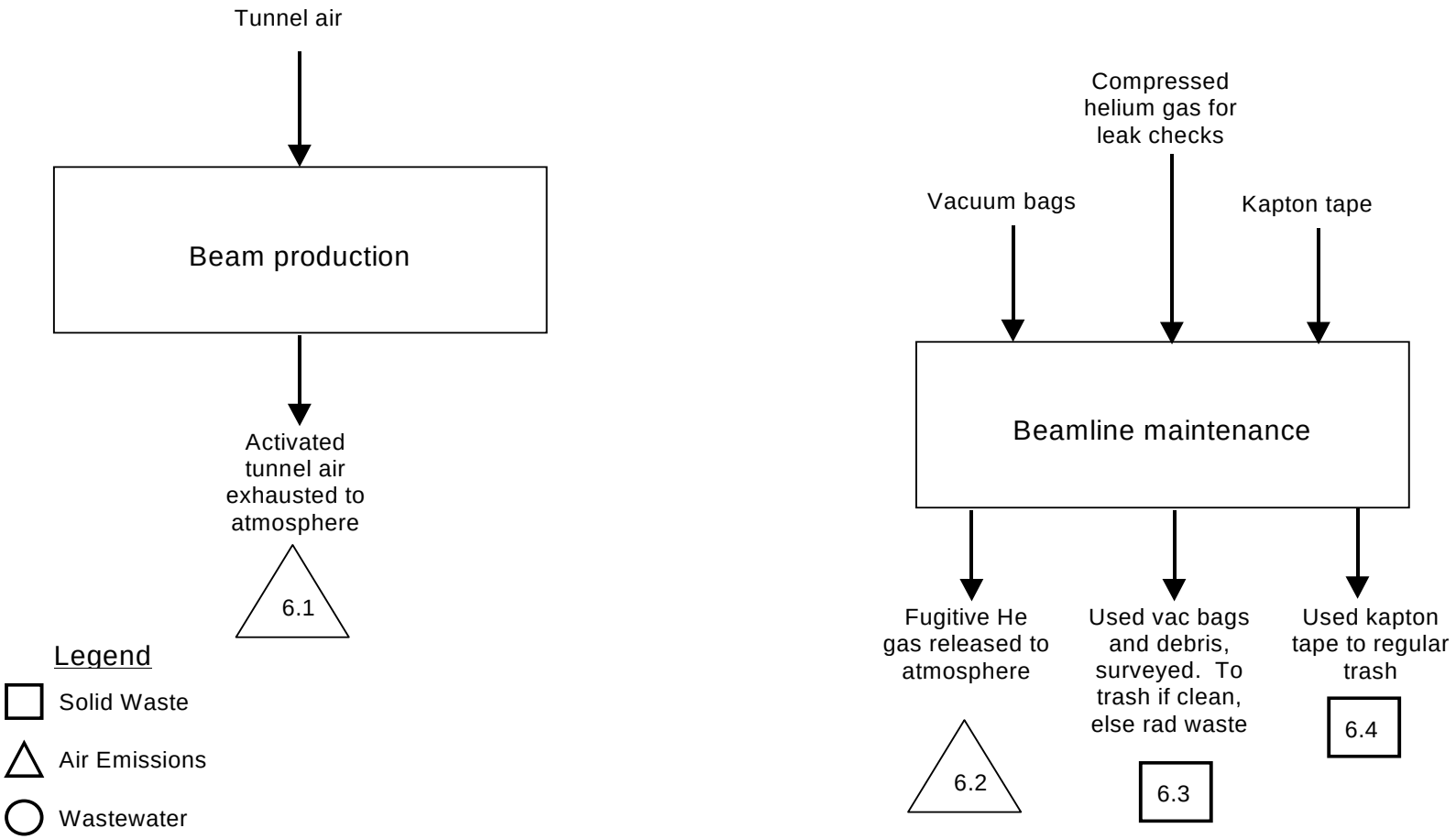
Filename: DWG-LIN-05.doc

BROOKHAVEN NATIONAL LABORATORY

BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

Upper Equipment Bay Process Flow Diagram

AGS-576-LIN-05



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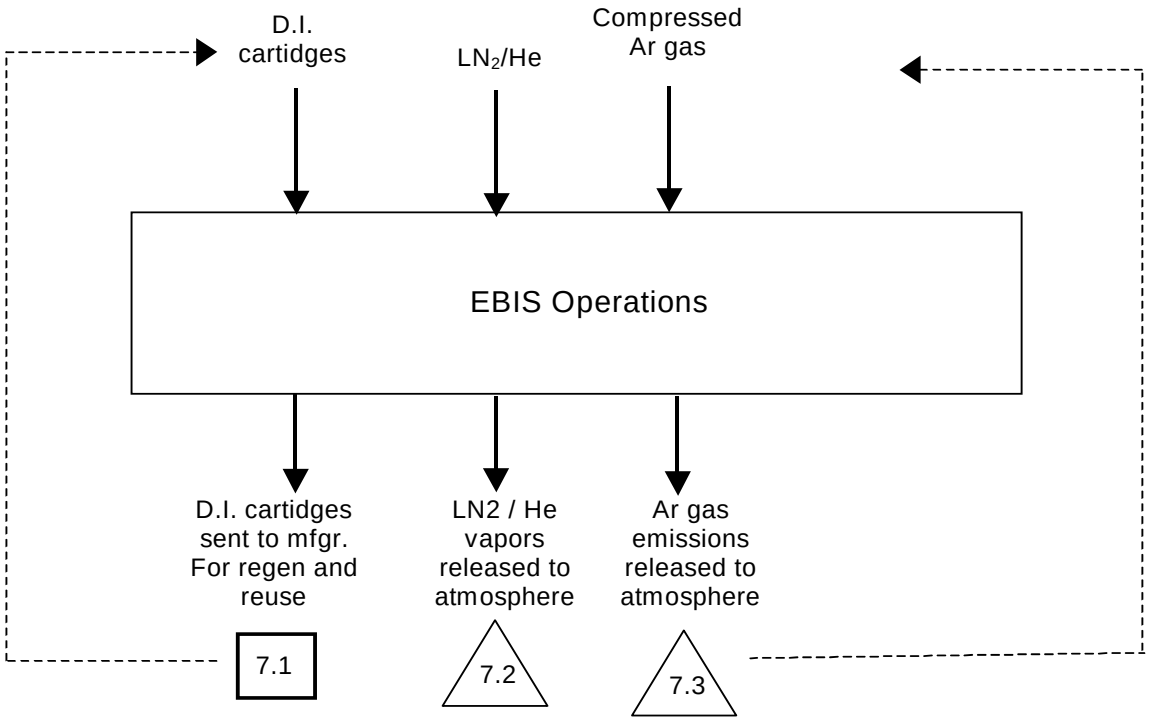
BROOKHAVEN NATIONAL LABORATORY

BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

Linac Tunnel
Process Flow Diagram

AGS-576-LIN-06



Legend

- Solid Waste
- Air Emissions
- Wastewater

SS = Sanitary Sewer

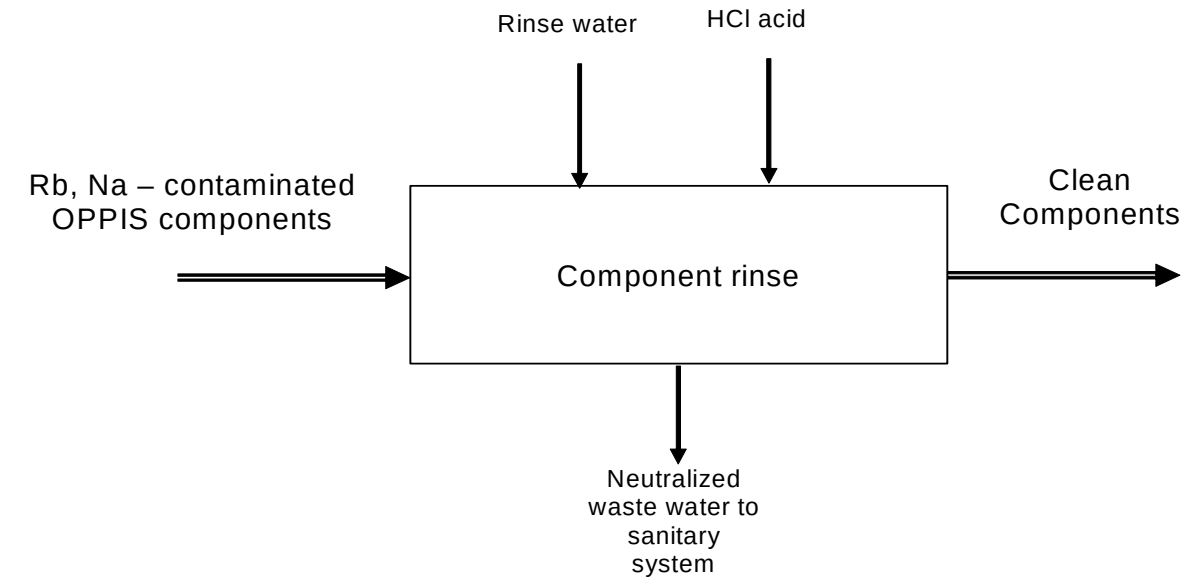
Filename: DWG-LIN-07.doc

BROOKHAVEN NATIONAL LABORATORY

BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

Electron Beam Ion Source
Process Flow Diagram

AGS-576-LIN-07



Legend

- Solid Waste
- Air Emissions
- Wastewater

SS = Sanitary Sewer

6.1 → SS

Filename: DWG-LIN-08.doc

BROOKHAVEN NATIONAL LABORATORY
PROCESS ASSESSMENT PROGRAM

OPPIS Maintenance
Process Flow Diagram

AGS-576-LIN-08